STORMSPOTTER

A Newsletter for Volunteer Storm Spotters and
Weather Watchers

NATIONAL WEATHER SERVICE WICHITA, KS — OCTOBER 15, 2000

So, How Good Are We?

By Dick Elder
Meteorologist-In-Charge

I don't know how many times I have had people say to me; "Boy, I wish I was a Weatherman so I could get paid for always being wrong!" I laugh that off because I know it is usually said in a non-derogating manner. However, it does get me to wondering if there is a basis for the comment.

These comments have prompted us to take a good look at the warnings and forecasts we provide to see just how good they are. We first looked at our severe weather warnings. We verify our warnings by county. So far in 2000, we have issued Tornado Warnings for a particular county on 12 occasions. The accuracy rate on these warnings were 75%. That means that 75% of the time, the tornado warning verified. Further, on the average the warning was issued 9.38 minutes BEFORE a tornado was actually sighted! As for Severe Thunderstorms, 217 county warnings have been issued. The accuracy rate on these was 86%. On the average, the warning got out to the affected county 15.79 minutes before the first report of large hail and/or high winds. Finally, with regard to Flash Floods, we issued 39 warnings for particular counties so far this year. These warnings were on the money 92% of the time. On top of that, the average lead time, or time between when our office issued the warning and the first report of flooding was 56.1 minutes!! To put these numbers in perspective, in 1999 the average accuracy rate for Tornado Warnings across the United States was 70%, Severe Thunderstorms was 81% and Flash Floods was 82%.

During the month of August and into early September the Central Plains was in the grip of a scorching heat wave. To illustrate the magnitude of this prolonged heat; in Wichita the average high temperature for August was 100.5, we had 16 days in a row of 100 degrees or higher. Other 100 degree day stretches included Winfield - 16 days, Salina - 13 days, Russell - 5 days, Hutchinson - 14 days, Chanute - 15 days, Parsons - 13 days, then Coffeyville - 15 days. Through times of abnormal weather conditions, what would normally be seen was the farther out in time a forecast goes, the more it skews toward climatology, which for this time period was in the lower 90s. For this event, our forecasters did not do that. Instead they accurately saw that this was a prolonged event and stayed with the unusually warm weather. Through this event, the average error in degrees on pinpointing what the actual high temperature would be each day for Russell, Salina, Wichita, and Chanute were: For our forecast for 3 days in advance 6.8 degrees, 4 days in advance 6.3 degrees, 5 days in advance 5.7 degrees, and for 6 days in advance 6.2 degrees. To put this in comparison, the average temperature error we were

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getting from our computer models was around 12 degrees.

So, I hope you will agree with me that the warnings you have been getting this year have been pretty darn good. The same thing can be said for the temperature forecasts you receive from our office. With that in mind, if you ever hear someone say; "Boy, I wish I could be a weatherman and get paid to always be wrong." At least help us out and respond; "Well don't go work at the Wichita National Weather Service Office because those guys are on the money most of the time."

The Southeast Kansas Tornadoes Of April 19TH

By Eric Schminke
Meteorologist

During the evening of April 19th, 2000, cyclical supercell severe thunderstorms developed over southeast Kansas. The severe thunderstorms spawned four tornadoes of which two were major, meaning they possessed rotational velocities of at least 113 mph. The two major tornadoes injured 30 people and were responsible for $71.8 million damage. The arrival of any tornado can be ill-timed, but one tornado's arrival probably couldn't have been worse. All things considered, the residents of southeast Kansas were *very* fortunate in that no fatalities resulted from this event. In fact, of the 30 injuries, the vast majority were due to cuts from flying glass. This latter statistic is surprising for a number of reasons:

1) The strongest tornado, an F3 one quarter mile wide possessing rotational velocities of 158-206 mph, hit Parsons which contains a population of nearly 12,000 in north-central Labette County.

2) At the time the massive vortex roared into southwest Parsons, *a week-long carnival was full swing where hundreds of people were outdoors enjoying the festivities*. The tornado, with a path length of 21 miles, inflicted an estimated $70 million damage in Parsons.

3) The NOAA Weather Radio tower in Erie became inoperative at 830 PM.

In nearby Erie, located 15 miles north of Parsons in central Neosho County, an F2 tornado possessing rotational velocities of 113-157 mph inflicted $1.8 million damage to the community. Like it's Parsons relative, this tornado was also one quarter mile wide but possessed a path length of 15 miles.

Southeast Kansas was served ample notice of the upcoming severe weather. At 1222 PM CDT, Weather Forecast Office (WFO) Wichita issued a strongly worded Hazardous Weather Outlook alerting all concerned parties to the potential for severe thunderstorms that evening. At 331 PM CDT, the first of six Short Term Forecasts was issued. At the time, no convection was occurring. However, the product stated that Tornado Watch #176 was in effect and clearly indicated that rapid thunderstorm development was likely across southeast Kansas with large hail, damaging winds and tornadoes all possible by-products. Subsequent issuances at 500 PM and 626 PM CDT were likewise disseminated before any convection had commenced. Less than an hour and a half elapsed between updates. Simply put, all concerned parties were provided frequent updates. It was obvious that the WFO Wichita staff was keeping a close vigil on the atmosphere's behavior.

It wasn't until nearly 8 PM CDT, *nearly four and a half hours after the first short term forecast was issued,* that thunderstorms first developed. This was immediately addressed in the fourth short term forecast issued at 757 PM CDT. This product included a call-to-action statement alerting people to the possibility of warnings being issued. The last two short term forecasts followed at 822 PM and 925 PM CDT, respectively, by which time Tornado Watch #178 was in effect.

Tornado warnings were issued the moment Doppler indications were that such storms were possible. In all, five tornado warnings were issued; the first at 748 PM CDT.

The following is a chronology of the tornado warnings and the tornadoes for which those warnings were issued. (All times in CDT).

748 PM - Tornado Warning issued for Montgomery County effective until 815 PM.

801 PM - First tornado (F0) develops 2 miles south of Havana in southwest Montgomery County.
Path length: 300 yards. Width: 50 yards.

805 PM - Second tornado (F0) develops 3 miles east of Havana in southwest Montgomery County.
Path length: 100 yards. Width 50 yards.

Lead time for Montgomery County tornadoes: 13 minutes.

810 PM - Tornado Warning issued for eastern Montgomery County effective until 845 PM.

819 PM - Tornado Warning issued for Neosho County effective until 900 PM.

820 PM - Third tornado (F2) develops in central Neosho County.
Initial touchdown: 6 miles southwest of Erie.

829 PM - Tornado Warning issued for Northern Labette County effective until 915 PM.

830 PM - Fourth tornado (F1) develops in eastern Montgomery County.
Initial touchdown: 3 miles south of Cherryvale.

834 PM - Fourth tornado exits eastern Montgomery County 4 miles southeast of Cherryvale.
Path length in eastern Montgomery County: 1 mile. Width: 200 yards. Damage: $100,000.

Lead time of fourth tornado, eastern Montgomery County: 20 minutes.

834 PM - Fourth tornado enters western Labette County, 7 miles west of Mound Valley.

840 PM - Third tornado dissipates.
Path length: 15 miles. Width: 1/4 mile.
Damage: $1.8 million. Injuries: 3.

Lead time of third tornado, Neosho County: 1 minute.

840 PM - Fourth tornado (F1) passes 4 miles south of Dennis, northwest Labette County.

845 PM - Fourth tornado enters southwest Parsons and intensifies to F3. The tornado roars through the central business district where a carnival is in progress. A total of 750 structures were damaged of which 633 were homes and 117 were commercial buildings. Of the 633 homes, 53 were destroyed, 112 sustained major damage, and 468 received minor damage. Of the 117 commercial buildings, 20 were destroyed, 28 sustained major damage, and 69 received minor damage. The most prominent commercial buildings hit: the Parsons Police Department, the Parsons Theater (which opened just one month earlier and had 30-40 occupants), the Parsons Plaza, the Eagles' Lodge (which was "sheared in half"), and, of course, the carnival, where every ride was destroyed. However, all but two people at the carnival (both workers) were able to seek shelter at the police department. (The two workers sought shelter next to a large truck.)

855 PM - Tornado warning issued for southeast Neosho County.

900 PM - Fourth tornado (F1) exits Labette County 2 miles northeast of Parsons.
Fourth tornado statistics, Labette County:
Length: 21 miles. Width: 1/4 mile.
Damage: $70 million. Injuries: 27. *(No injuries at either the carnival or the police station.)*

Lead time of fourth tornado, Labette County: 5 minutes. Lead time for Parsons: 16 minutes.

900 PM - Fourth tornado (weakening to F0) entered Neosho County 4 miles southeast of South Mound.

903 PM - Tornado blew down a hay barn and windows out of a house.

Damage: $25,000.

911 PM - Fourth tornado exited Neosho County into Crawford County (WFO Springfield CWA), 6 miles east of South Mound.

Lead time of fourth tornado, Southeast Neosho County: 5 minutes.

In summation, a significant tornado event occurred across southeast Kansas the evening of April 19th that could have easily resulted in loss of life. However, there were no fatalities because Southeast Kansas received ample warning of the impending severe weather that evening. Some locales, most notably Parsons, received 15 to 20 minutes' warning of the impending twisters. Short term forecasts provided four and a half hours' notice as to the threat of severe thunderstorms. As a result, law enforcement, emergency preparedness officials, as well as those at major facilities were able to implement evacuation procedures.

The residents of southeast Kansas weren't the only beneficiaries of such services. Neighboring Weather Service Offices such as Springfield, Missouri were able to issue severe local storm warnings in a timely fashion to protect those in their jurisdiction. National Weather Service colleagues in Tulsa and Norman, Oklahoma provided outstanding assistance in verifying the presence of tornadoes after the warnings had been issued. Simply put, the coordination among adjacent National Weather Service Forecast Offices was excellent and no doubt proved vital in the saving of lives.

The National Weather Service truly fulfilled it's mission to be the "No Surprise Weather Service".

Historic Heat Bakes Central & Southeast Kansas

By Phil Hysell
Lead Meteorologist

August and early September 2000 will be remembered by many for the relentless heat and dry weather that inflicted our area. In Wichita, a new record was established for the most 100 degree temperatures or greater in the month of August. In August 2000, the mercury reached or exceeded 100 degrees 23 times! This broke the previous record of 22 days of 100 degree weather in August set in the dust bowl year of 1936. For 16 consecutive days, from August 19th through September 3rd, the thermometer cracked 100 degrees, making it the third longest string of consecutive 100 degree days. Only July 3rd through July 20th, 1980 (18 straight days), and August 7th through August 26th, 1936 (20 straight days) had more consecutive days of 100 degree weather. New daily record high temperatures in Wichita were established August 25th, 26th and 27th, as well as September 2nd and 11th. In fact, the 106 degree reading on September 11th, was the warmest temperature ever recorded so late in the year.

All of these hot days made August 2000 the second warmest on record, with an average monthly temperature of 86.6 degrees. Only August 1936 was warmer with an average temperature of 89.0 degrees. For the entire year, Wichita saw 32 days of 100 degree heat, which ranked sixth all-time, and was the most since 1980 when 46 days of 100 degree weather occurred. The most 100

degree days in a year is 50 set in 1936. Weather records for Wichita date back to July 1st, 1888.

The heat was not only confined to Wichita. Temperatures soared over 100 degrees at Salina 20 days in August, while Russell saw the mercury climb over 100 degrees in August on 12 different occasions. Salina broke two daily record high temperatures on September 2nd and 11th, while Russell established new daily record highs on August 22nd, 23rd, and 25th, as well as September 2nd and 10th.

In southeast Kansas, Chanute experienced 100 degree weather on 13 days in August, and 4 more in September. Chanute established new daily record highs on nine different occasions in August, and five more times in September.

In addition to the oppressive heat, the lack of moisture also made weather headlines. Here at the Mid-Continent Airport in Wichita, we measured a slim 0.14 inches of rain in August, making it the third driest August on record. In 1913, no precipitation fell in August, while in 1936 only 0.04 inches of rain were observed in August. There were 27 consecutive days of dry weather, which was the longest stretch of dry conditions since late September through October 1999 when 30 consecutive days of dry weather occurred.

Salina was equally as dry in August, as 0.14 inches of rain was measured. Residents of Southeast Kansas felt the effects of the dry weather the worst, as no precipitation was reported in August at Chanute or Parsons.

Thankfully, no heat-related fatalities were reported in Central and Southeast Kansas.

NOAA Weather Radio Update

By Phil Hysell
Lead Meteorologist

NOAA Weather Radio Coverage has Expanded

Our NOAA (National Oceanic and Atmospheric Administration) Weather Radio network has expanded again! Previously, residents of Salina and McPherson could only obtain weather radio broadcasts from our transmitter in Ellsworth, Kansas. Because this transmitter was several miles away, the broadcast was difficult, sometimes impossible, to receive. Now, through a unique endeavor call the "Weather Radio Project", Emergency Management officials from Saline County raised money to purchase and install a weather radio covering Saline, Dickinson, McPherson, Marion, Morris and Geary counties. Over 20,000 dollars were raised in a a three month period from public and private donations. Another 60,000 dollars was supplied by the State of Kansas, which originally came from a FEMA (Federal Emergency Management Agency) grant following the devastating floods of 1993.

The transmitting antenna is located on a tower 10 miles south of Abilene in Dickinson County, and broadcasting began on September 1st, 2000. If you live in Saline, McPherson, or Marion counties, you can hear the weather radio broadcast on WXL-71 on a frequency of 162.525 MHz. This is a new frequency, so some of the older weather radio receivers may not have this frequency available.

While the National Weather Service in Topeka will be responsible for the broadcast of the new transmitter, severe weather watches and warnings issued by the National Weather Service in Wichita will still alert your NOAA Weather Radio quicker than any other means. (7 to 25 seconds after the warning is issued). Every day broadcasts will include a seven day forecast for the listening area, hourly weather observations from around the region, an area weather summary of past and future weather that will affect an area about 300 miles from the listening area, and daily climate information from Salina. On an event-driven basis, short term forecasts for the next one to three hours will be broadcast, as well as severe and winter weather watches, warnings, advisories, and statements.

Improvements to the NWR Broadcast

You may notice additional weather information added to your NOAA Weather Radio broadcast this autumn. Currently, "This day in weather history" airs on NOAA Weather Radio each morning from 6 AM to 9 AM.. Every day, this feature will provide you with an interesting weather event that occurred on this day in history. The National Weather Service provides a six day forecast for your area. On November 1st, we will expand this forecast to seven days to help you plan your upcoming week. Also, a 7 to 10 day outlook of temperatures and precipitation will begin to air on NOAA Weather Radio this autumn. This extended forecast will detail if temperatures and the chance for measurable precipitation will be above or below normal.

Outreach Activities

By Gloria Dill
Administrative Assistant

During the Spring, we were very busy with many talks to groups and other events. Some of the events we were involved include:

1. Chad Omitt and Chance Hayes participated in a Science Camp at El Dorado Lake where they talked to130 middle school students.

2. On April 26, Chance Hayes and Gloria Dill participated in a Health and Safety Fair at John Marshall Middle School in Wichita.

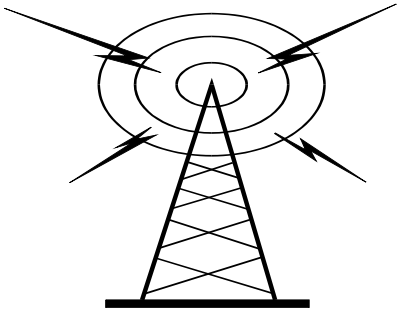
3. We had two sessions on April 27 for "Take Your Child to Work Day." This was enjoyed by those who came, and we thank Chad Omitt and Marian Baker who helped with the event. In the morning, Meteorologist Chad Omitt shadowed two students, a Junior from Maize High School and a Senior from Goddard High School. In the afternoon, Service Hydrologist, Marian Baker, brought her son Joe to shadow her on the job. Joe is 11 years and a 6th grader at Wilbur Middle School in Wichita

4. On May 7, Noelle Runyan, Phil Hysell, and Bruce Wightman attended a Safety Fair at McConnell Air Force Base, given by the Kansas Air National Guard, where approximately 200 to 300 employs and families attended. The "Tornado in a Box" along with pamphlets were displayed.

5. Some of the school weather safety talks given were: Dick Elder to two 5th-grade classes in Arkansas City, Noelle Runyan to two 4th-grade classes at Maize, Greg Noonan and Chance Hayes to four High School classes in Russell and Sylvan Grove, Phil Hysell and Chance Hayes to 150 7th-grade students at Robinson Middle School in Wichita, and Chance Hayes to 200 6th-graders in El Dorado. Numerous other safety talks were given to groups such as: Dick Elder to Gordon Evans Energy Center, Eric Schminke to Equillonpipe, Dick Elder to Western Resources, Phil Hysell and Chad Omitt to Vulcan Chemical and KG&E, Leon Wasinger to El Dorado Police Reserve, Hayden Frank and Chance Hayes to 100 military retirees at McConnell Air Force Base, and Phil Hysell to Lakeside Mobile Home Park.

6. Greg Noonan and Gloria Dill helped at a Career Fair at South High School in Wichita.

7. On May 23, Kevin Darmofal, Phil Hysell,



and Greg Noonan participated at the Walnut River Festival at the Butler County Community College in El Dorado.

Employee Update

By Gloria Dill
Administrative Assistant

The Wichita office had only one change of personnel this past six months. Mark Wilson, Hydrometeorological Technician, transferred to us on March 6 from Del Rio, Texas, where he was in the Air Force for nine years as a Weather Forecaster. Mark is originally from Louisiana. We welcome him along with his wife, Dana, and their two sons, Alex and Aaron.

Cooperative Observer Award Ceremonies

By Gloria Dill
Administrative Assistant

Since our April 2000 newsletter, several Length-of-Service Awards were given to the following dedicated Cooperative Observers who have volunteered their time in providing the National Weather Service climatic data (Precipitation, Temperature, and River Readings).

May 11 - Leon Wasinger awarded Jan Vining, of the Caney 4W, a 25-year length of service award for providing Precipitation readings.

May 16 - Michael (Joe) Rosner awarded Vernon and Betty Hickman for 35 years of service in providing Precipitation and River readings for the Barnard area.

June 16 - The Kansas State University Southeast Agricultural Research Center was presented a 25-year award by Leon Wasinger for providing Temperature and Precipitation readings for the Parsons 2NW area. Accepting the award for the center was Dr. Lyle W. Lomas.

June 16 - Observer Richard Robbison accepted a 15-year award from Michael (Joe) Rosner for providing Precipitation readings for the Halstead 3SW area.

July 7 - Michael (Joe) Rosner, along with Richard Elder and Chance Hayes, awarded Thomas and Mary Beth Wilson a 40-year award for providing Temperature, Precipitation, and River readings for the Lincoln 1ESE area.

Sept. 15 - Billie J. Heitzenrater of the Beaumont area was presented a 35-year award by Leon Wasinger for providing Precipitation readings.

Sept. 26 - Richard Elder presented Martha Wiens, from Inman, a 40-year award for providing Precipitation readings.

The National Weather Service would like say, "Thank You," to the above individuals, along with all the Cooperative Observers, for your time and dedication. It is greatly appreciated!!

Summer 2000 Student Volunteer Program

By Gloria Dill
Administrative Assistant

This year, the Wichita office had the largest summer student volunteer group with six volunteers along with having one paid summer employee. Our SOO (Science and Operations Officer), Pete Wolf, coordinated this program along with Gloria Dill assisting with the paperwork. The paid employee was Holly Kreutzer who is a freshman at Washington University at St. Louis, Missouri. The volunteers

included Kelly Wise (Senior at Wichita State University), Sarah Jones (Sophomore at Kansas State University), Ryan May (Sophomore at Oklahoma University), Courtney Powers (Junior at Heights High School), Katie Bay (Junior-Home School), and Hannah Lytle (Sophomore at Goddard High School).

The volunteers assisted the forecasters with many of their duties along with helping out with numerous special projects. They also gained insight into what a career in the National Weather Service would encompass. To show our gratitude for all their hard work, the office had a pizza party. Pete Wolf presented them a Certificate of Appreciation, and invited them to return next summer.

Precipitation Terminology

By Phil Hysell
Lead Meteorologist

What does it mean when you hear our forecast say "the chance for precipitation is 20 percent."? The percentage given in our precipitation forecast is the likelihood of occurrence at any given point in the forecast area during a specified period of time. A precipitation event is defined as at least 0.01 inches of liquid content. Normally, the period of time is 12 hours, unless specified otherwise. The forecast area, or zone, is generally considered to be a county. At times, some NWS forecasters will use the terms "occasional" or "periods of" to describe a precipitation event that has a high probability of occurrence, but will be of an on and off nature.

POP Percent	Expressions of Uncertainty	Equivalent Areal Coverage
10%	None Used	Isolated or few
20%	Slight Chance	Widely scattered
30 - 40 - 50%	Chance	Scattered
60 - 70%	Likely	Numerous
80 - 90 - 100%	None Used	None used

Other areal coverage terms such as "isolated" or "widely scattered" may only be used when the chance of precipitation somewhere in the forecast area is very high, but the areal coverage is relatively small. For precipitation amounts of a trace (less than 0.01 inches), the terms "sprinkles, drizzle or flurries" may be used and a POP statement will not be included.

The next time you hear there is a 30 percent chance for precipitation, that means of the last 100 occurrences, precipitation has fallen 30 times at a particular point during a similar weather pattern.

Estimating Rainfall Intensity

Intensity	Rates - Inches
Light	Less than 0.2 /hour
Moderate	0.2 to 1.1 /hour
Heavy	1.1 to 2.2 /hour
Very Heavy	2.2 to 4.5 /hour
Intense	4.5 to 7.1 /hour
Extreme	more than 7.1 /hour

Fall and Winter Outlook . . . 2000-2001

By Chad Omitt
Meteorologist

After the historical late summer heat and dry conditions . . . everyone is looking for relief in the form of cooler temperatures and increasing moisture. With the beginning of Autumn already past, many are asking what to expect for the remainder of this Fall through the Winter. The latest forecast from the Climate Prediction Center branch of the National Weather Service calls for near normal temperatures and near normal precipitation for the remainder of the Fall season which officially runs through November. Meanwhile, the official forecast for this Winter, defined as the period of December-February calls for above normal temperatures and above normal precipitation. With the warmer than normal winter forecast, some are wondering if another El Nino or La Nina might be affecting our weather. Believe it or not, for the first time in three years...there will be no El Nino or La Nina phenomena occurring this Winter. Interestingly, last Winter was the eighth warmest on record while the Winter of 98-99 ranked as the seventh warmest on record. In other words, chances are this Winter will be colder than the past few.

SKYWARN

By Chad Omitt
Meteorologist

As another severe weather season comes to an end...the vital network of volunteer spotters known as SKYWARN will shift their attention to Winter Weather threats including heavy snow and ice. It is important to know that Winter Weather hazards associated with heavy snow and ice can be just as dangerous as the more familiar threats of tornadoes and lightning. For example, between 70 and 90 people across the country die each year due to winter weather hazards such as automobile accidents on snow-covered roadways. In comparison, tornadoes kill on average 70 people every year! With these threats in mind...the National Weather Service in Wichita anticipates activating our SKYWARN spotters whenever snowfall or ice poses a threat to life and property. When snow and ice storms occur, we ask that our volunteers report what is happening at their location. Reports will then arrive at our office via the telephone, the Internet or amateur radio. Our spotters provide the "ground-truth" to our forecasters. Radar may tell us that heavy snow is falling, but it cannot tell us how much snow is on the ground or if rain is mixing with the snow. Spotters do. The reports are used by forecasters to send out public statements, warnings and advisories, and short-term forecasts to raise awareness of the weather hazards. So as we head through Autumn and toward Winter, we at the National Weather Service in Wichita look forward to working with our SKYWARN team to keep the public informed of Winter Weather Hazards.

Attention SKYWARN spotters...Winter is approaching and so will be our need for snowfall reports!

The Dangers Of Winter Weather

By Eric Schminke
Meteorologist

For most of the past three months, Kansans have been baking in 100-degree heat. (Moreover, it has been very dry as only 0.14 inch of rain was recorded at Wichita's Mid Continent Airport in August with only a scant 0.06 inch recorded thru mid-September). Therefore, thoughts of snow, sleet, freezing rain, single digit temperatures, and sub-zero wind chills have probably been the farthest items from one's mind. However, fall has arrived, and having done so, Old Man Winter is lurking just around the corner, ready and willing to reach into his bag of tricks and pull out some nasty surprises.

As all know, when one thinks of severe weather in Kansas, the tornado is the first creature that comes to mind. However, being centrally located, the

"Sunflower State" can just as quickly be sent spiraling into a deep freeze as it would be by a rip-roaring tornado. In fact, chances are *far* greater that a Kansan will catch the brunt of a winter storm than he would the wrath of a tornado.

As hinted earlier, one finds a wide variety of severe winter weather in Kansas. Last winter, three snow storms hit central and south-central Kansas. All wreaked havoc on the affected areas, closing schools and businesses, snarling traffic, and inflicting widespread damage to trees and power lines. In some cases, people were without power for close to a week. Perhaps the most noteworthy occurrence was on December 4th and 5th, when six to twelve inches of heavy, wet, *thunderstorm*-enhanced snow buried a narrow swath of south-central Kansas including the Wichita Metropolitan area. On January 3rd, just one month later, Old Man Winter was in the mood for more fun and games, celebrating the new millennium by dumping six to thirteen inches of snow on a 50-70 mile wide area of central Kansas from Great Bend to Marion *in a five to six hour period*.

Old Man Winter also found Kansans to be quite sociable, "shooting the breeze" on 13 occasions with gusts of 40 mph or more. The most long-winded conversation occurred on March 8th when 40-60 mph winds with gusts around 70 mph whistled a variety of tunes across nearly all of central, south-central, and southeast Kansas from mid-morning thru late afternoon. Trees were uprooted, power lines knocked down, and roofs were damaged.

The National Weather Service issues numerous products specifically designed to alert the public of impending severe winter weather. The following list identifies each product and it's definition:

Watch: Issued to alert the public to the *possibility* of severe winter weather.

Warning: Issued to alert the public that severe winter weather is *imminent* or *occurring*.

Advisory: Issued to advise the public of *potentially* dangerous winter weather that doesn't meet the requirement of a warning.

Heavy Snow Warning - Accumulations of at least 6 inches in 12 hours and/or at least 8 inches in 24 hours.

Freezing Rain Warning - Ice accumulations of at 1/4 inch with winds at least 15 mph or at least 1/2 inch with lesser wind.

Blizzard Warning - Visibility frequently 1/4 mile or less reduced by snow and/or blowing snow caused by winds of at least 35 mph.

Wind Chill Warning - Wind chill indices colder than 35 degrees below zero for at least 3 hours.

Winter Storm Warning - Any combination of the above by-products is imminent or occurring.

High Wind Warning - Sustained winds at least 40 mph for at least 1 hour or at least 58 mph for any duration.

Snow Advisory - Accumulations of 2 to 5 inches are forecast.

Freezing Rain Advisory - Ice accumulations that cause travel or walking difficulties. *No damage to trees or power lines expected.*

Blowing Snow Advisory - Visibility occasionally reduced to near 1/4 mile caused by winds of 25-34 mph. The term *near blizzard* is sometimes used with winds of 30-34 mph.

Wind Chill Advisory - Wind chill indices of 25 to 35 degrees below zero for at least 3 hours.

Wind Advisory - Sustained winds at least 30 mph for 1 hour or at least 45 mph for any duration.

Dense Fog Advisory - Widespread visibilities of less than 1/4 mile.

An important note on dense fog: *Dense fog can be very dangerous if it occurs with temperatures near or below freezing. Under these conditions, black ice can form quickly! Be very careful when driving or walking as visual detection of this ice is very difficult! Even at temperatures of 32-34 degrees, black ice can form on bridges and overpasses; turning them into skating rinks!*

Short Term Forecast - Another handy product issued by the National Weather Service. When wind chills reach critical levels, extreme temperature codes are employed to further alert the public of potentially dangerous wind chills. ***Code White*** is issued whenever wind chills of zero to 24 below are imminent or occurring. ***Code Blue*** is issued whenever wind chills of 25 below zero or colder are imminent or occurring.

Hopefully, the above information provides all concerned a better understanding of the products and services provided by the National Weather Service during the winter. Winter weather can be potent - and lethal. A better understanding of the above products is a major step toward protecting yourself and your family from the dangers of winter weather.

A Month That Kansas Will Never Forget

By Hayden Frank
Meteorologist

It is pretty hard to think of winter, after the brutally hot summer that we just experienced. In case you forgot, it can get quite cold around here. I am sure that many of you may remember December of 1983. Here is a summary of the events that took place during that historic month.

Through the first 15 days of December of 1983, the average high temperature was 36.8 degrees, and the average low was 21.7 degrees. The normal high temperature for the first half of December is 45.1 degrees, with an average low of 25.1 degrees. The result was an average temperature that was 5.8 degrees below normal. The only day of measurable precipitation occurred on the 3rd, when 0.43 inches of freezing rain fell.

The first half of December had gotten off to an unusually cold start. However, this was nothing compared to what happened during the second portion of the month. On December 13th, the high in Wichita reached 40 degrees. A cold front moved through that night, and the mercury never reached the freezing mark for the rest of the month. On December 17th, a true arctic cold front plowed through the region, setting the stage for the coldest week ever recorded in Wichita. Temperatures on the evening of the 17th, fell into the single digits, and would not rise above 10 degrees for over a week! In fact, the temperature fell below zero around midnight on the 21st, and remained at or below zero for a record 110 hours, until the mercury finally reached a high of 10 degrees on Christmas afternoon. The overnight lows were at or below zero for 8 consecutive days, from the 18th through the 25th, which was also a record. Another reinforcing shot of arctic air resulted in overnight lows below zero on the 29th and 30th. The coldest day of the month was on the 24th when the high only reached 2 below zero, and the low was 10 below zero. As for precipitation for the second part of the month, all of it was obviously in the form of snow. The heaviest snowfall occurred on the 20th and 21st, when 10.1 inches fell. However, lighter snows fell throughout the rest of the month.

During the second half of December, the average high was 16.0 degrees, and the average low was -2.2 degrees. The normal temperatures for the latter half of December are a high of 41.0 degrees, with a low of 21.0 degrees. The average temperature for this period was an incredible 24.1 degrees below normal!

Summarizing the entire month, the average high was 24.0 degrees, with an average low of 8.7 degrees. The normal high for a typical December is 43.0 degrees and the normal low is 23.0 degrees. The result was an average temperature of 16.4 degrees, which went down as the second

coldest month ever recorded, since weather records began in 1888. The coldest month ever was in January of 1940, when the average temperature was 16.2 degrees. In addition, there were a total of 11 days that the low temperature was at or below zero, which is the most ever recorded in a month. There was a total of 13.8 inches of snowfall, which places it as the third snowiest December on record.

Be Prepared Before Winter Storms Strike

By Bruce Wightman
Hydrometeorological Technician

The National Weather Service and the American Red Cross, recommend that you prepare for winter weather before it arrives. Winter storms are most often referred to as deceptive killers.
There are three main dangers that are associated with winter weather. First, many people are killed in automobile accidents on icy and snow covered roads. Second, people die of heart attacks from the strain of shoveling heavy snow. And third, people die of hypothermia after prolonged exposure to the cold.

Here are a few things you can do to prepare for winters arrival and your survival. At home and at work the primary concerns is the potential loss of heat, power, telephone service, and a shortage of supplies if storms conditions continue for more than a day. It is recommended that you have the following items available. A flashlight with extra batteries. A battery-powered NOAA weather radio and portable radio to receive emergency information. Those two items may be your only links to the outside. Have extra food and water available. Generally high energy foods are preferred, such as dried fruit or candy, and food requiring no cooking or refrigeration is best. It's also not a bad idea to have extra medicine, baby items and first aid supplies.

If you are planning to travel during the winter months. The first step you should take is to make sure you vehicle has been winterized. Check the latest weather forecast to avoid putting yourself and your family at risk of being stranded. If you do become stranded, a Winter Storm Survival Kit can help to SAVE YOUR LIFE. A Survival Kit should include the following items: blankets/sleeping bags; flashlight with extra batteries; first aid kit; knife; high calorie, non-perishable food; extra clothing to keep dry; a large empty can and plastic cover with tissues and paper towels for sanitary purposes; a smaller can and water-proof matches to melt snow for drinking water; sack of sand (or cat litter); shovel; windshield scraper and brush; tool kit; tow rope; booster cables; water container; compass and road maps. Also, keep your gas tank near full to avoid ice in the tank and fuel lines.

If you do become stranded, the best thing to do is to remain in your vehicle. It is very easy to become disoriented in the wind-driven snow and cold. You should run your vehicle's motor approximately 10 minutes each hour for heat. Also, exercise by moving your arms, legs, fingers and your toes to help keep warm. A very important thing to do is to make sure you keep your radiator and exhaust pipe free of obstructions. In order to help prevent carbon monoxide poisoning, open one of your windows a bit, for ventilation.

Winter weather can be very beautiful, but at the same time be very dangerous. Just remember to use caution when venturing out into the cold winter land.

Measuring Snowfall and Snow Depth

By Leon Wasinger
Hydrometeorological Technician

When it comes to accurately and consistently measuring snow, perfection will never be obtained. Snow is simply too dynamic. One can improve his or her snow

measuring skills by understanding what a proper snowfall measurement requires. The accuracy in measuring snow requires the following.

1. Understanding the difference between snowfall and snow depth.

2. Knowing when to measure the snowfall and snow depth.
3. Having a proper location to measure the snow accumulation.
4. Using proper equipment.
5. Measuring the liquid content of snow.

Snowfall is the snow that has fallen from the sky, new snow, and has collected on the ground with no melting, evaporation or rain occurring to change its character. This measurement is reported in inches and tenths. (8.5 inches)

Snow depth is how much snow is remaining, on the ground, at any given time. This measurement shows how fast the snow is disappearing or melting. People who report this measurement report it once a day until the snow is gone or less than a half inch. This reading is reported to the nearest whole inch. (5 inches)

Note: *Snowfall (new snow) becomes part of the total snow depth (old snow) once it has been measured and recorded.*

The National Weather Service has Cooperative observers all over the nation. They report precipitation, snowfall and snow depth readings every 24 hours around 7 in the morning. Accurate snowfall measurements are not easy to obtain because of the many variables that may occur, like a warm ground, wind, temperature and mixed precipitation. Measuring snow just after the event will help limit the time it has to melt. One can also take a measurement before he or she goes to work, clear that spot and take another reading at noon time or after work, clear that spot, and measure again before bed, but limit it to no more than 4 readings in one day. Add these together for a snowfall total.

Snow depth will be how much snow is left on the ground at observation time, generally 7 AM for cooperative observers.

Location is very important for a accurate snow measurement. Wind moves the falling snow at a angle and on the ground drifts the snow. Sidewalks and driveways retain the sun's heat and melts snow. A proper location needs to be away from buildings, sidewalks and driveways. An area that allows the snow to fall in a uniform depth with limited drifting, like a open back yard or field with wind breaks at a distance. A ratio of 1 to 2 should be used for buildings and trees. For instance, if a building is 20 feet high, then the snow measuring location should be about 40 feet from the building. If a tree is 50 feet high you should be about 100 feet from the tree. An open wind swept field is not a good location. If the snow falls with no wind or slight breeze a wood deck next to the house would work fine. Not everyone has the best area, so use your best judgment, pick an area that comes closest to working for you.

To measure snow, a yard stick works fine. Measure three locations, a high point, a low and a mid point. Add them together divide by three.

The liquid content of snow can be found by taking a core sample, melting the sample and measuring it. You will need a can with straight sides, like a coffee can, how wide the can is does not matter. The can needs to be at least as deep as the snow depth is. Lets say you measured 6 inches of snow, Take your yard stick and find a spot that has a 6 inch depth. Take your can and push it into the snow, pull it out, and with your hand, scoop the remainder of the snow into the can to make a complete snow core sample. Next melt the sample to a liquid. Measure the sample with a ruler. Cooperative observers have a special can and measuring stick to do this, but the idea still works the same.

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